

## ABSTRACT

Embodiments of this invention include application of new inferential methods to analysis of complex biological information, including gene networks. In some embodiments, time course data obtained simultaneously for a number of genes in an organism. New methods include modifications of Bayesian inferential methods and application of those methods to determining cause and effect relationships between expressed genes, and in some embodiments, for determining upstream effectors of regulated genes. Additional modifications of Bayesian methods include use of time course data to infer causal relationships between expressed genes. Other embodiments include the use of bootstrapping methods and determination of edge effects to more accurately provide network information between expressed genes. Information about gene networks can be stored in a memory device and can be transmitted to an output device, or can be transmitted to remote location.